Farmer Dies when he is Pinned under his Tractor that rolled over on an Incline

SUMMARY:
On September 10, 2004, a 62 year-old farmer died after his tractor rolled over on an incline and pinned him underneath. He was spraying weeds along the edge of his field, at approximately a 25-degree angle on a hill with an Allis Chalmers WD45, tricycle-front-end tractor. (Figure 1) The container of weed spray was attached to the back of the seat of the tractor. The tractor was not equipped with a cab or rollover protection structure (ROPS). When her husband did not return home, the victim's wife became worried and contacted neighbors and then the sheriff's department. Having no success in locating the victim, the helicopter from a nearby hospital was contacted. The emergency personnel arrived in the helicopter equipped with spotlights to join the search. The tractor was located upside-down in tall weeds down the incline of a hill. The victim was found pinned underneath the tractor. Emergency medical persons were present when the victim was located and they examined the victim. No signs of life were found. The medical examiner was contacted and pronounced the victim dead at the scene. The FACE investigator concluded that to help prevent similar occurrences, farmers should:

Figure 1. Side view of Allis Chalmers WD45 after the incident.

- **only use tractors that are fully equipped with an operator restraint system and rollover protective structures (ROPS).**
- **wear a seat belt when operating a tractor equipped with a ROPS.**
- **use extreme caution when operating tractors on or near sloped terrain or embankments.**
- **use caution when pulling or carrying any equipment attached to the tractor.**

INTRODUCTION:
On September 10, 2004, a 62 year-old farmer died after his tractor rolled over on an incline and pinned him underneath. The Wisconsin FACE program director/field investigator learned of the incident through the death certificate on October 25, 2004. The FACE investigator reviewed the death certificate and the coroner and sheriff reports, and interviewed the victim's wife on March 17, 2005.

The victim grew up on a farm and farmed in a partnership until 1998, when he began farming 95 acres on his own. He began breeding dairy heifers and raising them until they were ready to be

sold at a sales ring for milking. Additionally, the victim rented woods, pasture and 60 acres of land where he raised hay, oats, and corn. Corn was the main cash crop in addition to using a portion of it for feed. This incident occurred on his land.

At the edge his field was an uncultivated area where the victim had cut trees. This area had some tree stumps in it. Tall weeds had grown here. This area sloped downhill at an angle of about 25 degrees. Approximately 25-30 yards from the edge of the field and down the hill was a fence. The victim was spraying weeds at the edge of the field.

The victim was safety conscious and subscribed to several farm magazines. The family attended farm shows and safety fairs about once a year. He learned to operate farm machines while growing up on their family dairy farm. In addition to farming, he also had experience in milling corn, but enjoyed taking care of animals and raising dairy heifers. The victim had no previous history of serious injuries that would inhibit his operation of the tractor or farm equipment.

INVESTIGATION:
The area had a total of approximately .23 inches of rain the night of the fifth and the morning of the sixth, four days before the incident. The temperature reached 71-84 degrees during the day the previous four days before the incident and on the day of the incident, the weather was dry and sunny. The high temperature that day was 84 degrees with a low of 60 degrees that night. The incline was not wet or slippery.

The victim went to his brother's home to get him and brought him back to his farm to cut wood or load hay while the brother was available to help. They had lunch together before the victim took his brother home again. About 3:30 p.m. that afternoon, the victim called his wife, who was working in a nearby town at her job, and told her he was going to go out to the field to hay. He told her he knew he would be late so the family should go ahead and eat without him. She thought it was odd when he was not home an hour after they had eaten and by 1½ hours later she began looking around the farmyard for him. About 9:00 p.m. she realized that the hay equipment was home and after looking in the barn, noticed that a tractor was gone. She called her neighbors and they came over and helped her look for the victim. When they had not found him by 11:00 p.m., they called the non-emergency number of the police and a deputy arrived at the farm 28 minutes later. A second deputy arrived and the two deputies and the neighbors took two separate four-wheel drive trucks and began checking the property with flashlights to see if they could find him. After failing to find him, they called the Sheriff Department Investigator to bring the thermal imager (heat-seeking camera) to the farm. One group began searching in one of the four-wheel drive trucks, while the other group went to a different area of the farm. When they were unable to find any sign of the victim, the sheriff's department contacted the nearby hospital's medical helicopter to come to the farm and help search the area with their large spotlight. About 1:30 a.m., while the helicopter was shining the spotlight on the ground around the farm, one of the neighbors spotted the tractor upside down on an incline over the bank near the woods. The emergency medical personnel were present and examined the victim. They found no signs of life. The medical examiner was paged at 1:38 a.m. and arrived about a half-hour later. The victim was pronounced dead at the scene. The fire department had also been contacted and in turn contacted a towing company. The fire department and the company raised the tractor and removed the victim from under it.

The area where the victim was found was on the side of a hill less than 25 feet from the edge of the field. The field was on a flat terrain with the edge of it near an area where trees had been cut. This area was not cultivated. This area had a hill that was about a 25-degree angle sloping down. A fence was approximately 25-30 yards from the edge of the field. The victim had been spraying weeds along the uncultivated area of the edge of the field. He was using the Allis Chalmers tractor and a tank with a sprayer on it attached behind the seat on the tractor. The tractor rolled down the hill toward the fence that was located partway down the hill, but did not roll into the fence. The victim ended up face down with his legs under the fenders and his back under the tractor seat. The tractor was a narrow tricycle front-end Allis Chalmers that was not equipped with a cab or ROPS.

CAUSE OF DEATH: The death certificate listed the cause of death as traumatic asphyxiation as a result of a tractor rollover.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Farmers should only use tractors that are fully equipped with an operator restraint system and rollover protective structures (ROPS).
Discussion: The tractor in this incident was not equipped with a seatbelt or ROPS when it was manufactured. The model, an Allis Chalmers WD45 tractor, was no longer made after 1952 and no ROPS are made to retrofit this model tractor. It is very important to use only the ROPS recommended by the manufacturer or tractor dealer. ROPS are engineered specifically for each tractor and must pass a series of dynamic and static tests. They must also meet the test and performance requirements of OSHA 1928.52 CFR. According to the National Farm Medicine Center in Marshfield, WI, "Due to dynamic forces which act upon a ROPS during a tractor rollover, it is imperative that a ROPS be properly designed, manufactured and installed. Proper materials and mounting hardware as well as engineering design, are necessary to ensure safe performance. A ROPS is not something to be fabricated in the farm shop."

Recommendation #2: Wear a seat belt when operating a tractor equipped with a ROPS.
Discussion: An operator restraint system should always be used with ROPS to keep the operator within the zone of protection in case of an overturn or other event that could cause the operator to be ejected from the operator seat. The victim had neither a roll-over structure nor a seatbelt to help prevent his fatal injuries. Without wearing a seat belt during an overturn, the operator of a tractor could be thrown from the protected area of the ROPS and subsequently crushed by the tractor.

Recommendation #3: Use extreme caution when operating tractors on or near sloped terrain or embankments.
Discussion: Tractor overturn incidents are directly influenced by many factors including the dimensions of the tractor and the dynamics of the tractor's operation such as the proximity of the tractor to slopes and embankments, rocks or stumps, etc. The slope and angle of travel that the tractor takes in relationship to the slope or embankment also influences the stability of the tractor.

Recommendation #4: use caution when pulling or carrying any equipment attached to the tractor
Discussion: The position of the tractor's center of gravity with respect to its tires can influence the stability of the tractor. In this case, the narrow front of the tractor, the incline of the terrain and the weight of the chemicals in the container may have all affected the overturn of the tractor.

REFERENCES

A Guide to Agricultural Rollover Protective Structures. 2003, National Farm Medicine Center, Marshfield, WI. Available at http://www.marshfieldclinic.org/nfmc/rops.
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National Institute for Farm Safety. 2004, Ohio State University. Available at http://www.ag.ohio-state.edu/~agsafety/NIFS/historyc.htm
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29CFR 1928.51 (b) Code of Federal Regulations, U.S. Government Printing Office, Office of the Federal Register.